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Resolving the Difference in Electric Potential within a Charged Macromolecule[1] SHUANGJIANG LUO, JINGFA YANG, JIANG ZHAO, Institute of Chemistry, Chinese Academy of Sciences — The difference of the electric potential between the middle and end of polystyrene sulfonate (PSS-) chain is discovered experimentally. Using a pH-responsive fluorophore attached to these two locations on the PSS- chain, the local pH value was determined by single molecule fluorescence technique: photon counting histogram (PCH). By the observation of a very high accumulation of proton (2-3 orders of magnitude in concentration) at the vicinity of the PSS- as the result of the electrostatic attraction between the charged chain and protons, the electric potential of the PSS- chain is determined. A higher extent of counterion adsorption is discovered at the middle of the PSS- chain than the chain end. The entropy effect of the counterion adsorption is also discovered - upon the dilution of protons, previously adsorbed counterions are detached from the chain.

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